THE EXCHANGE NETWORK
A White Paper of the
INFORMATION INTEGRATION NETWORK
Draft - August 1, 2000[1]

PURPOSE

This paper intends to advance the discussion on the opportunities for state environmental agencies and EPA in implementing an Exchange Network by: 1) discussing the need for and benefits of the Exchange Network concept; 2) defining the components of the Exchange Network, and 3) discussing strategic implications and implementation issues, and 4) making recommendations for action.

DISCUSSION

Background: In 1998, the State/EPA Information Management Workgroup (S/E IMWG) proposed a vision and core operating principles for creating a partnership for collaborative environmental information management[2]. Since then, a more specific vision for how this partnership might be realized in the form of a national environmental information exchange network (Exchange Network) has been evolving. The Exchange Network vision is one where participating agencies avail their information holding to other participants of the Exchange Network directly from their own agency's web presence[3], based on agreed-upon neutral standards-based formats and secure Internet transaction protocols. (Detailed discussion of the shared expectations for the Exchange Network and potential implementation steps can be found in Attachments A and B).

Why the Exchange Network?: Three primary drivers are evolving that make it essential that environmental regulatory agencies re-think the information management infrastructure they employ to collect, use, and share environmental data:

1**) The changing nature of state and federal environmental protection roles:** A wide array of individual information-sharing relationships exists between states and EPA. Each individual information-sharing relationships was designed to meet specific business needs and state and federal legislative demands. As the demand for integrated environmental information has risen, the collective complexity of these information sharing relationships has created a situation where information is difficult and burdensome to share across programs or organizational boundaries.

2) The changing nature of the environmental protection business: a) The business elements of environmental protection continue to face a growing emphasis on cross-media, integrated, results-based approaches to environmental protection, b) pressures from the regulated community to rationalize the environmental reporting process and reduce burden, and c) a legal and policy commitment to effective public access[4]. Thirdly,

3) The increasing expectations of the American public for government to follow the private sector's lead in implementing information technology to improve customer service and allow for transparent access to environmental information, regardless of which level of government is responsible for it. The success of private companies in using Internet-based technologies to cut costs and increase productivity has been attributed by some to the ability of company management to consider new business arrangements- new supply line models, and unconventional organizational relationships. The Agency should be equally creative and open to the possibility of change.[5]

Benefits of the Exchange Network:

Implementation of the Exchange Network effectively will create a "standards-based" lexicon of environmental information. This will have significant impacts to our many efforts to improve environmental protection. Retrofitting such an infrastructure in place will: 1) **improve** the capacity to conduct cross-media, integrated, results-based approaches to environmental protection; 2) **rationalize** the environmental reporting process and thus reduce reporting burden on the regulated community; and, 3) **allow** for improved understanding of the environmental information provided to regulators and the public by improving data quality, timeliness, and allowing for effective interagency error-correction processes. **Improvements in our ability to target resources to priority problems, to provide a more-informed policy-making process, to conduct cross-media impact assessment, and improve enforcement and compliance programs are all potential benefits of the Exchange Network.**

Adopting a neutral exchange format has many operational benefits: 1) it greatly simplifies and reduces the burden inherent in the current exchange processes; 2) it gets states out of the business of directly loading EPA national systems, solving state access problems and simplifying EPA information security control management; 3)dual data management and funding/resource concerns-dual data entry, dual quality concerns, dual error correction processes, etc. are minimized: and, 4) formats for data exchange can be based upon common business needs, rather than computer system design, and consequently can be consistent in format and style across media lines, allowing for a holistic change management system to be implemented. Significantly, once the exchange negotiation process is disconnected from system design, partners agencies are freed up to reengineer systems at their own pace without having to coordinate systems changes with regulatory partners. Consequently, states will be able to coordinate horizontally with other agencies within the state in response to the state CIO's directives on data and technology standards.

While ensuring EPA continued access to regulatory-required information collected in delegated state programs, and improving the efficiency of interagency information sharing, the Exchange Network also will offer many new opportunities. Network participants will be able to access and use many data collections not routinely exchanged between agencies. (i.e. PCS minors, UST, spatial data sets). States will be able to access each other's information collections as well as EPA's. Many new opportunities for collaborative public access strategies, that have not existed to date, can be explored and help us answer the question - How do we compliment each others public access offerings - and not duplicate them? More generally, the Exchange Network will allow for the collective exploration of opportunities to leverage each others assets, talents, and strengths.

Components of the Exchange Network

Data Standards and Transaction Sets - For common business areas where information is exchanged, a system of neutral exchange formats, composed of agreements on data content (data standards), data format (transaction sets), meta data, technical formats, quality specifications, and exchange schedules will be negotiated among participating agencies.

Exchange Process - Donor agencies will extract information from their internal systems, and host it on their Internet sites in the agreed-upon exchange format, where it will be available anytime for other partners to access. Where EPA is the receiving partner, EPA would acquire the information on a periodic schedule from the Internet, 'pull' it into the Central Data Exchange Facility (CDX), reformat the data from the exchange format into the program system-specified format, and load it into the EPA system[6]. Likewise, EPA would avail its information collections to states - the change in EPA's focus from Central Receiving to Central Data Exchange.

Policy Infrastructure - In order for the Exchange Network to operate, and be sustainable, an interagency framework must be established to negotiate operational policies and business. Guidelines on data quality, timeliness, error correction, meta data expectations, and standard operating procedures

will all need to be developed. Largely, the policy infrastructure can be guided by stewardship. Three delineations of stewardship can be assumed: 1) Network Governance - The Network itself will require interagency governance, people empowered to lead, manage, to establish and govern a framework for exchanges and trading partner agreements, and direct the expansion of the network beyond its initial participants; 2) Stewardship of the data itself will be required–the data standards, the transaction set standards, definitions, meta data etc. Each participating agency, as an Exchange Network partner, in agreeing to host their information assumes data management responsibility for their portion of the Exchange Net; and 3) Stewardship of the data exchange process. An active management system monitoring the operations and maintenance of the actual exchange will need to be established (Refer to the companion document--*Stewardship and Governance: A white paper of the Information Integration Initiative* for more detailed information.)

Trading Partner Agreements - A generic framework for how participating agencies share their information collections with others is required. In cases of regulatory reporting requirements, more specific and formal Trading Partner Agreements (TPA) will need to be negotiated. Currently information requirements are defined in many places (delegation agreements, NEPPS, ICRs, etc,) these will have to be coordinated.

Technical Infrastructure - Each participating agency will have to ensure that it can provide the capacity to offer access to its information holdings, while maintaining the security and integrity of their information systems. The private business-to business e-commerce sector is heavily investing in Extensible Markup Language (XML) for exchanging information between partners. To adopt XML as the preferred exchange protocol, technical issues (network capacity, security, Internet connections, changing versions of Internet protocols, browser upgrades) will all have to be examined for impact on participating agencies, as well as sustainability and stability of the network.

Strategic Implications of the Exchange Network concept and Implementation Issues

Represents a new paradigm for sharing information - The Exchange Network vision, where participants avail their information holding to other participants directly from their own agency's web presence represents a radical departure from the current state/EPA data 'reporting' relationship. Traditionally states have been responsible for directly loading information into individual EPA National systems. Using the Exchange Network, states would make their information available for EPA to access, and EPA would assume the responsibility for getting the information into its computer systems. Existing delegation agreements that specify information requirements, some NEPPS agreements, electronic reporting trading partner agreements, informal ad-hoc data acquisition arrangements, all will need to converge into documented Exchange Network trading partner agreements. This would also impact the information collection processes from the regulated community.

Recognizes Interdependence - While there has been a shift for most states from acting as agents for EPA to directly carrying the weight for the majority of environmental protection programs[7], our collective business functions remain inherently interdependent. As such, the information managers must collectively understand that since our business functions are interdependent, as are supporting information needs.

Requires a Community - The Exchange Network can only be successful if there is an interconnected community of people who exchange information via the Network. The network is not just the technical infrastructure and policies. It requires a functioning community of environmental regulators[8]. The network concept is going to require that this community work in ways it has traditionally not been accustomed to, and that will require leadership to achieve and support these new arrangements.

Standards - We will need to develop both data standards as well as standard transaction sets. Ideally the data standards would come first, but that may not be practical in many situations. Neither should necessarily hold the other up. While the Data Standards Council is operational, it is not positioned to

take on the simultaneous negotiation of all the necessary transaction set formats. (The S/E IMWG should address this need.)

Not everyone will be ready at the same time. The concept of the Exchange Network requires that participants be current in information technology. For the foreseeable future, EPA will have to accommodate conducting business along traditional means for others still (or not) transitioning to the Exchange Network. This will require dual operation in many cases which will have resource implications.

Trading Partner Agreements (TPA) - Based upon our past experience and research into trading partner agreements[9], and following the e-commerce world, a mechanism for managing the many trading partner agreements will be necessary. It is essential that this be handled in a global manner to avoid many distinct individual trading partner agreements from being the norm. This process has to flush out issues such as unacceptable data quality, untimeliness, non-participation, and specify error-correction processes. Further, the TPA's would need to spell out for states managing federal programs, any other requirements unique to managing federal records (i.e. criminal enforceability)

Technical Infrastructure -Secure transactions- how to we ensure integrity of the network? Is a virtual private network (VPN) desirable? Can partners realistically post data outside firewalls for others to pick up or is through-the-firewall access going to be necessary? Levels of Internet traffic, readiness of XML, bandwidth requirements, and security measures all need careful investigation to ensure we can base our business arrangements upon them. EPA must ensure that its Central Data Exchange Facility (CDX) is capable of both receiving information from and providing information to the Exchange Network. We must better understand the data flows between agencies before committing to an implementation path. We must further research the technical path to EPA being able to "Come and get it" from states and mutually commit to a rational path to get there. One logical first step is to ensure that the on-going facility data synchronization pilots are successful and lead to implemented business practices.

Policy Infrastructure - What interagency business rules on the operations of the network should be established? Guidelines on data quality, timeliness, error correction, meta data expectations, etc. need to be negotiated? Change management practices can be synchronized. How do we best leverage each others work? Once initially set up, a second tier of issues will surface: What will the relationship to other external networks be (i.e. EDEN, Global Climate Change Net)? How should the network be broadened beyond initial participants? There may be pressure on EPA to broaden the Exchange Network faster than may be responsible. And thirdly, how can the negotiated exchange formats between agencies be leveraged to improve reporting streams from the regulated community?

RECOMMENDATIONS

Interagency Recommendations**:**

- Establish a mechanism and process for negotiating exchange transaction formats
- A robust documentation of the current data flows and existing information trading agreements between states and EPA be carried out.
- Several pilots on information exchange between EPA and states should be started to isolate both technical and "business policy/practice problems, define solutions and implement "fixes" to start data exchanges. This begins with the successful completion of those currently underway (IDEF, Facility Exchange Pilots)
- A long-term implementation plan be developed by the end of FY2000.

EPA Recommendations

- To insure rapid agreement on the necessary standards the AA's must assign task force members from their programs to participate in interagency workgroups (i.e. the Data Standards

Council) as a **priority Agency action**

- New ways to present meaningful integrated information to the public should be developed by examining and building on applications that show promise e.g., Chesapeake Bay Profiles, EnviroViz, Diana, Demographic Mapper (EJ), Decision Consequences Model--Region 3 and RAINS in Region 10.
- We should develop a truly integrated management and analysis system that integrates not only cross-program pollutant data but links it to pollution trends, GRPA results, ambient and facility compliance, enforcement actions, and our budget expenditures[10]
- We should be proactive in using our data to show how progress is being made under the each of the GPRA objectives to build cases, using data, to project future conditions and strengthen our budget requests with expected results and time frames.

End Notes:

1. August 1, 2000 draft reflects editing refinements only and no substantive changes from the July 27, 2000 draft.

2. *State/EPA Vision and Operating Principles for Environmental Information Management:* State/EPA Information Management Workgroup, January 1998. (www.state-epa-info-group.org/Vision/vision.html)

3. While the Exchange Network will involve many types of exchanges, the primary focus will be Internet-based and hence the this document is focused on Internet-based exchanges.

4. U.S. EPA, *The Problem with Environmental Reporting*, One Stop Reporting Program Strategy, 1996.

5. From *e-Government - An experiment in Interactive Legislation*, 2000. (http://cct.georgetown.edu/development/eGov/description.cfm)

6. All currently planned functions for CDX

7. US EPA & ECOS, *Environmental Pollutant Reporting Data in EPA's National Systems: Data Collection by State Agencies***,** June 1999.

8. "Letting go ... For a generation, highly centralized 'command and control' systems have been the primary means of managing the complex affairs of a community [enviro regulators] Now, following the private sector's lead, government is beginning to see that a more distributed approach, akin to that of a network, may be the better way to address the many messy, complex, and potentially competitive interrelationships that exist in a truly intelligent community" Peter Katz**,** *When Space & Time Collapse: The New Community*, Gov. Technology, May 2000

9. Extensive work on developing prototype Trading Partner Agreements has been done via the State Electronic Reporting/EDI Subcommittee (SEES) in conjunction with the National Governors' Association)

10. EnviroViz, Region-3 and RAINS, Region 10, have started down this path.